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# Globalisation and sticky prices: “con” or conundrum?

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## Abstract

With reference to a case study which illustrates the existence of segmented markets and international price discrimination, this paper develops a theoretical model of comparative advantage in which domestic prices may be sticky. We show, when domestic prices do not converge to world prices, the effects of international trade upon domestic welfare are ambiguous. In particular, for a nation with no absolute advantage, specialising in comparatively advantageous production will reduce welfare where prices are sticky. This finding contrasts with the general view that pursuit of comparative advantage will always increase welfare.

**JEL Codes** A1 General Economics; C6 Mathematical Methods and Programming; F1 Trade

## 1. Introduction: cons and pros

Comparative advantage is a cornerstone of globalisation theory. It theorises that, where two countries trade, they will both be better off if they specialise in producing the products that they make comparatively better (Ricardo, 1817; Dornbusch *et al.*, 1977; Shiozawa, 2007). The merits of globalisation are seen by some economists as incontestable (Harford, 2007) and have been confirmed in terms of aggregate economic growth (Dreher, 2006). As summarised by Samuelson and Nordhaus (2010: 442), “the theory of comparative advantage is one of the deepest truths in all of economics”. Bernhofen and Brown (2005: 208) similarly claim “The one point on which most economists will agree is that opening up to international trade will increase a country’s economic welfare”. See Arkolakis *et al.* (2012) for a recent review of theory and some limited empirical results.

Notwithstanding, it is clear that trade between economies may be more complicated than trade within an economy. For example, some argue that the benefits of globalisation are illusory or at least limited to those who wield economic power (Canterbery, 2001; Dong-Hyeon *et al.*, 2012; McClintock, 1996; Samuelson, 2004). This raises the issue of asymmetric free trade where the benefits of trade are particularly clouded in developing economies: “instead of workers moving from low productivity jobs to high productivity jobs, [supposedly] the ‘promise’ of liberalization, workers move from low productivity jobs to unemployment” (Stiglitz 2002: 4). Even in developed economies, the effects of trade liberalisation may not be entirely benign; for example, Melitz and Trefler (2012) claim jobs in the USA have been lost as a result of import substitution.

Globalisation may also lead to environmental damage; in this connexion, Brander and Taylor (1997: 549) claim “international trade may provide lower steady-state utility than autarky, and the overall welfare consequences of free trade may well be negative”. Fujiwara (2012) also warns that increasing international trade can lead to welfare losses because of pollution.

Our contention is that, even where free trade occurs symmetrically, the benefits from free trade are ambiguous as one of the implicit assumptions of the model is often not realised: the assumption that domestic prices adjust to world prices. In practice, domestic prices may not be free to adjust quickly to converge with world prices. As Ricci (2006: 52) outlines, “trade theory usually ignores the existence of short-run market rigidities”.

Previous analyses of international trade have used different assumptions. Some writers refer to monopolistic competition (Melitz and Trefler, 2012; Neary, 2009: 225); others assume oligopoly (Neary, 2009: 241). Arkolakis *et al.* (2012) consider perfect competition and monopolistic competition. In the following, we determine mathematically the consequences on welfare if this assumption is not realised. Our model is a conventional, two-economy, two-good model, except that we do not assume that domestic prices adjust to world prices. Rather, we assume that prices are either “sticky”, or that market segmentation and price discrimination occurs. This assumption may significantly change the conclusion of conventional globalisation theory: to wit, rather than trade improving welfare, our model suggests that globalisation could harm a domestic economy.

The remainder of the paper is as follows. In section two we discuss the evidence of sticky domestic prices in an international context. Our mathematical model is specified in section three, where we also discuss the implications of the analysis; section four concludes the paper.

## **2. Sticky prices: consumers, contradictions and costs**

### **2.1 Motivating case study**

In 2002, Levi Strauss, a multinational clothing manufacturer and retailer, closed its last two factories in Scotland, claiming that “production costs in Scotland were up to 60% higher than elsewhere in Europe” (BBC News 22 March 2002).<sup>1</sup> The company had “done its sums” (*ibid.*) and concluded that the UK plants were uneconomic. However, any savings that the domestic (UK) consumer might have expected to make from the anticipated cost reductions were not realised. The local price of this clothing did not decline. Indeed, later that same year, Tesco, a major UK supermarket, lost a legal battle to parallel-import Levi jeans sourced from Mexico, Canada and the United States. By importing the jeans and reselling to the domestic market, Tesco would have been able to reduce the retail price to the UK consumer by nearly 50% (*Telegraph* 1 August 2002). However, the European Court of Justice (ECJ) ruled that retailers required trademark holders’ permission to import goods in this way.

Since the Tesco court case, Levi Strauss has continued to take legal action to maintain segmented markets for its products. In 2011 it secured an injunction against the online retailer Papikian’s use of its trademark and applied to prohibit Papikian from importing Levi jeans into Europe (Krongold Law, 2011). The USA judge ruled that the latter issue was a matter for the ECJ, but as Calboli (2012) has pointed out, the ECJ has adopted an increasingly narrow interpretation of “consent” over the last ten years, further strengthening the protection for trade-mark holders. Thus, globalised manufacturers are able to take advantage of international labour markets to reduce costs, while retailers are constrained from taking

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<sup>1</sup> This was part of Levi Straus’ policy of shifting away from internal production towards outsourcing: the last of its American factories were closed in 2003, its Canadian factories in 2004.

advantage of international goods markets to reduce prices. In other words, UK (and European) consumers are forced to pay a premium above the world price. This case study highlights that, while the costs of globalisation to UK workers are evident in terms of reduced job security, the benefits of globalisation are, at the very least, questionable.

## **2.2 Generally sticky prices**

The lack of instant adjustment of “sticky prices” in response to a change in supply or demand has frequently been observed in economics (Álvarez *et al.*, 2006; Faia and Monacelli, 2008; Ricci, 2006). An explicit expression of this conundrum is made by Lipsey and Swedenborg (2007: 20), who claim “international differences in national price levels and prices of individual products are striking and have persisted over long periods, despite the presumed equalizing influence of international trade and despite the liberalization of trade and reduction of transport costs that have occurred.” Such differences in international prices exist even within the European Union, despite the supposed Single Market: “between 65% of firms (Spain) and 92% (Germany) use price discrimination ... About half of firms charge different prices depending on the country [in which] the good is sold” (Dhyne *et al.*, 2009: 67).

Despite general consensus within economic theory, the assumption that domestic prices will converge to world prices can be granted only limited empirical support. In the UK, there is much anecdotal evidence of prices failing to adjust fully to world prices (see, for example, *Telegraph* 22 June 2009, *Guardian* 13 April 2012, *Daily Mail* 31 May 2012).

There are many reasons why the price of a good may differ between two countries, such as:

- tax-rates may be higher in one country than another (Jones, 1987; Melitz and Trefler, 2012: 103).
- imports tend to lower prices (Melitz and Trefler, 2012: 97); therefore import barriers – artificially constraining supply – may prevent domestic prices falling to world prices.
- a government may subsidise exports (Neary, 2009; Trela *et al.* 1987).
- exchange-rates between currencies may be held at an artificial level by government so as to promote a current account surplus.
- random changes in exchange-rates may have long-term effects on prices where adjustment is slow (Frankel, 1984).

The above reasons apply in any market structure, including perfect competition. If a firm has monopoly power (monopoly or monopolistic competition or oligopoly), there are more reasons why prices may differ between countries:

- a firm may carry out “dumping”, i.e. selling below cost price in a foreign country to gain future profits (Neary, 2009).
- a firm with market power could set different prices in different countries, depending on demand elasticity.

## **3. The mathematical model: confidence and commodities**

In what follows, we develop a mathematical model for a two-country, two-commodity world. We show that, gains from trade do not follow where prices are sticky. We begin by

considering a closed economy and the level of consumption therein. This analysis is expanded to an open economy model where nations pursue comparative advantage. National welfare is compared to the closed economy model. Where prices are sticky, the open economy may have lower welfare.

### 3.1 The closed economy case

Consider a two-good economy, country 1, with goods  $q$  and  $s$ . The quantities *per capita* produced in one period of time are  $q_1$  and  $s_1$  respectively. The goods are perishable, thus the level of consumption in the absence of trade is also  $q_1$  and  $s_1$ . The maximum *per capita* level of  $q_1$  which may be produced is  $a_1$  and the maximum level of  $s_1$  is  $b_1$ . The production frontier is linear, hence we may write:

$$q_1 = a_1 - \frac{a_1}{b_1} s_1$$

Suppose the numeraire is the *per capita* production in one time period. The budget constraint is  $p_1 q_1 + r_1 s_1 = 1$ . Hence the prices of good  $q$  and good  $s$  are  $p_1 = \frac{1}{a_1}$  and  $r_1 = \frac{1}{b_1}$  respectively. The budget constraint is equivalent to the production possibility frontier in this case. The objective is to maximise utility  $u = A q_1^\alpha s_1^\beta$  subject to the budget constraint:

$$\max F(q_1, s_1, \lambda) = A q_1^\alpha s_1^\beta - \lambda \left( \frac{q_1}{a_1} + \frac{s_1}{b_1} - 1 \right).$$

The solutions to this problem are:

$$q_1^* = \frac{\alpha a_1}{\alpha + \beta} \quad \text{and} \quad s_1^* = \frac{\beta b_1}{\alpha + \beta}.$$

### 3.2 The open economy case – price discrimination

Consider a two-country model in which economy 1 has a comparative advantage in good  $q$ ; i.e.  $\frac{a_1}{b_1} > \frac{a_2}{b_2}$ . Therefore economy 1 specialises in good  $q$ :  $a_1$  units of  $q$  are produced,  $q_1$  for local consumption and  $(a_1 - q_1)$  for export. In each market, the price charged is the greatest the market will bear. Because of “sticky prices”, the domestic price in neither economy will adjust to the world price.

The price of  $q$  in the local economy (as before) is  $p_1 = \frac{1}{a_1}$  and the price in the foreign economy is  $p_2 = \frac{1}{a_2}$ . The price of good  $s$  in the local economy is  $r_1 = \frac{1}{b_1}$ . The value of exports is  $p_2(a_1 - q_1)$  and the cost of domestic consumption is  $p_1 q_1 + r_1 s_1$ . Hence the budget constraint is:

$$p_1 q_1 + r_1 s_1 = p_1 q_1 + p_2(a_1 - q_1) \Leftrightarrow \frac{s_1}{b_1} = \frac{a_1}{a_2} - \frac{q_1}{a_2}.$$

Therefore we have the constrained maximisation:

$$\max F(q_1, s_1, \lambda) = A q_1^\alpha s_1^\beta - \lambda \left( \frac{q_1}{a_2} + \frac{s_1}{b_1} - \frac{a_1}{a_2} \right).$$

which implies:

$$q_1^* = \frac{\alpha a_1}{\alpha + \beta} \quad \text{and} \quad s_1^* = \frac{a_1}{a_2} \frac{\beta b_1}{\alpha + \beta}.$$

Comparing this result to the case of the closed economy, we see that economy 1 consumes the same amount of good  $q$  as before, but it will consume less of good  $s$  unless  $a_1 > a_2$ , which is to say that it enjoys an absolute advantage in producing good  $q$ . In the situation where economy 1 enjoys a comparative, but not absolute advantage in good  $q$ , the consumption of good  $s$  declines and the utility of economy 1 must decrease.

Hence, where an economy enjoys a comparative, but not an absolute advantage in production, the gains from trade will result only where local prices are allowed to adjust to world prices. In the presence of “sticky prices”, international trade may result in a decline in a country’s welfare if it does not have an absolute advantage in either good. This confounds the standard result from comparative advantage: “small countries have the most to gain from international trade” (Samuelson and Nordhaus, 2010: 437) as small countries, lacking the potential for economies of scale, may be at an absolute disadvantage in production of tradable goods.

#### 4. Conclusion

Based on an indicative case study, we suggest that the theory of trade suggested by comparative advantage does not lead unambiguously to increases in domestic utility. An implicit assumption of the standard model of international trade is that domestic prices of tradable goods will adjust to world prices. However, there is a deal of evidence that this assumption is not supported by real world practice. Where, through asymmetries of market power or for some other reason, world prices do not feed through to the domestic economy, our analysis shows the supposed benefits of trade may not be realised. Indeed, the pursuit of comparative advantage may leave the domestic economy worse off. In practice, domestic governments must address the issues of “sticky prices” and price discrimination as a part of their overall approach to international trade.

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